Synthesis of the 7-Cyano-2,6-Dimethyl, and 2,3,6-Trimethyl Heptadienes-2,6 of the Nitriles of the Geranic and 3-Methyl Geranic Acids

SOV/79-29-4-32/77

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii (Moscow Institute of Fine Chemical Technology)

SUBMITTED: March 31, 1958

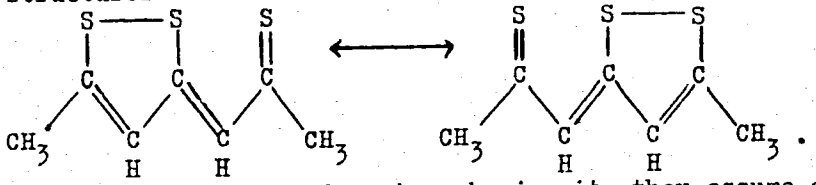
Card 3/3

5 (3)
AUTHOR: Shustorovich, Ye. M. SOV/79-29-7-82/83

TITLE: Letter to the Editor (Pis'mo v redaktsiyu). The Electron Structure of Thio-thiophthene (Ob elektronnom stroyenii tio-tioftena)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 7, pp 2459-2460 (USSR)

ABSTRACT: Recently, the results of an X-ray structural analysis were published on the molecule of thio-thiophthene (Ref 1). This molecule was found to be planar and to have the parameters and structure given in the scheme (Formula 1). The authors of that report (Ref 1) try to explain the structure and the aromatic nature of thio-thiophthene by superposition of the structures



Although the authors do not emphasize it, they assume a delocalization of the σ-bond S-S with the π-electrons of the

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rings in the common system. It seemed more plausible to the author of the present report, that in the molecule of the thio-thiophthene the delocalization of the π-electrons took place in the bicyclic field of the eight centers (I). There the S-S-bonds appear as pure π-bonds without the σ-bonds as is assumed by C. A.Coulson and I. Duchesne (Ref 2) for the N-N bond in N_2O_4. The structure mentioned is in accordance with the planar state of the molecule and with the values of the angles and the distances between the atoms to be considered. The distance between the sulfur atoms is 2.36 Å , whereas the length of the ordinary S-S-bond (in compounds of the R-S-S-R type) is 2.04 Å (Ref 3). In connection with it it will be understood why the formation of an oxygen analogue of thio-thiophthene (II) is difficult. The distance O-O remains 2.36 Å in this case as it is determined by the position of the skeleton consisting of the carbon atoms. The author expresses his gratitude to Ya. K. Syrkin and M. Ye. Dyatkina for the criticism made regarding the paper. There are 4 references.

Letter to the Editor. The Electron Structure of Thio- SOV/79-29-7-82/83
thiophthene

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii (Moscow Institute of Fine Chemical Technology)

SUBMITTED: January 19, 1958

Card 3/3

5.3100, 5.3700(B)

66434

~~5 (4)~~

AUTHORS: Shustorovich, Ye. M., Dyatkina, M. Ye. SOV/20-128-6-39/63

TITLE: The Molecular Orbits of Dibenzene Chromium, Ferrocene, and the Cobalticinium Cation $Co(C_5H_5)_2^+$

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 6, pp 1234 - 1237 (USSR)

ABSTRACT: The authors start from the point of view that the electronic structure of aromatic metal complexes can be determined by the methods of molecular orbits (mo) only. Since M. Yamazaki (Ref 2) published the method for the quantitative calculation of the mo of ferrocene $Fe(C_5H_5)_2$ in 1956, the authors have been engaged in the calculation of the mo of dibenzene chromium $Cr(C_6H_6)_2$ and the cobalticinium cation $Co(C_5H_5)_2^+$ as well as the checking of the data concerning ferrocene given by Yamazaki. The calculations were made according to the method developed by C. C. J. Roothaan (Ref 3). It was assumed that the mo of these compounds are formed of the mo of the rings C_5H_5 and C_6H_6, respectively, (consisting of the 2pπ atomic orbits of the C-atoms) and the

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The Molecular Orbits of Dibenzene Chromium, Ferrocene, and the Cobalticinium Cation $Co(C_5H_5)_2^+$

SOV/20-128-6-39/63

nine $3d^5 4s\ 4p^3$ atomic orbits of the central atom. Further, the following simplifying conditions were assumed to hold for the purpose of the calculation: 1) the 18 valency electrons of the complex are found in the positive field of the central atomic residue (Cr^{6+}, Fe^{8+}, Co^{9+}) and the residue of the C-rings in which each of the C-atoms has a positive charge; 2) all 18 electrons are represented by Slater wave functions (Table 1); 3) in the matrix of non-orthogonality the non-diagonal terms $S_{i,j}$ ($i \neq j$) equal zero; 4) in the calculation of the H_{ij} elements of the matrix all resonance integrals between not neighboring C-atoms were considered to equal zero, while for neighboring C-atoms β_{CC} was assumed to equal 2.39 ev; 5) in the calculation of the diagonal elements H_{ii} of the matrix corresponding to the $2p\pi$ atomic orbits of the C-atoms the energy of the valency state of the ($W_{2p} = -11.28$ ev) was considered as it is usually done in the calculation of the π-electron system; 6) in the matrix

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of the interaction of the electrons the integrals of the form $\int \frac{\varphi_i^2(1)\varphi_j^2(2)}{r_{12}} d\tau_1 d\tau_2$ only were considered; 7) the interaction of the $3d_{z^2}$ atomic orbits with the mo of the C-rings could be neglected, as can be seen from the integrals of non-orthogonality given in table 2. The calculated energies of the mo are contained in table 3. The distribution of the electron density and the calculated effective charges of the individual atoms of the molecules are given in table 4. In dibenzene chromium the Cr-atom has a positive charge of 1.147, in ferrocene Fe a charge of +0.068, while in $Co(C_5H_5)_2^+$ the Co-atom is negatively charged (-0.118). Thus, in $Cr(C_6H_6)_2$ there occurs a shift of the electrons from the metal to the rings, while a dipole moment forms. The same effect occurs to a less degree in the case of ferrocene. In the case of cobalticinium, however, the electrons are shifted from the rings to the central atom and compensate the

SHUSTOROVICH, Ye. M. Cand Chem Sci -- (diss) "Electronic Structure of Metal-Aromatic Complexes," Moscow, 1960, 16 pp, 160 copies (Institute of Chemical Physics, AS USSR) (KL, 49/60, 126)

SHUSTOROVICH, Ye.M.; DYATKINA, M.Ye.

Calculation of the ground state of the ferrocene molecule with the aid of the molecular orbital method with self-consistency. Zhur strukt. khim. 1 no.1:109-121 My-Je '60. (MIRA 13:8)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni M.V. Lomonosova i Institut obshchey i neorganicheskoy khimii imeni N.S. Kurnakova.

(Ferrocene)

S/076/60/034/03/024/038
B005/B016

AUTHORS: Shustorovich, Ye. M.,
Dyatkina, M. Ye. (Moscow)

TITLE: Calculation of Two-center Molecular Integrals Including d-Orbitals

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol 34, Nr 3, pp 644-650 (USSR)

TEXT: When calculating the energy values of the molecular orbitals of aromatic metal complexes it is necessary to calculate a number of molecular integrals which include charge distributions of the type $\chi\chi'$. Here, χ denotes the atomic s-, p-, and d-functions according to J. C. Slater. To solve this problem the authors of the present paper used a method developed in the last years by Roothaan, Ruedenberg and Jaunzemis (Refs 1-5). In this method nearly all types of two-center molecular integrals occurring in the method MO LKAO, can be calculated by means of one and the same auxiliary functions. The present paper mainly consists of three tables which given the calculated intermediate solutions and solutions of two-center Coulomb integrals and the nuclear attraction integrals for the following charge distributions:(ns)(n'd), (np)(n'd), (nd)(n'd). There are 3 tables and 5 references.

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S/076/60/034/008/030/039/XX
B015/B063

AUTHORS: Shustorovich, Ye. M. and Dyatkina, M. Ye.

TITLE: Some Molecular Integrals With the Participation of 3d, 4s, and 4p Orbits

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 8, pp. 1843-1846

TEXT: In Ref. 1, the authors had obtained general formulas for the calculation of the Coulomb integrals and of the integrals of electron attraction by nuclei for any combination of Slater's atomic orbits. The representation applied was similar to that of Roothaan (Ref. 2). In the present work, the authors have derived equations for calculating integrals with the participation of 3d, 4s, and 4p Slater atomic orbits. These equations were obtained from calculations of the molecular orbits of aromatic metal complexes of the metals of the first transition period of the periodic system. The integrals of nuclear attraction and one-center Coulomb integrals are exactly calculated, whereas simpler approximate equations are proposed for the two-center Coulomb integrals. Some two-center Coulomb integrals

Some Molecular Integrals With the Participation of 3d, 4s, and 4p Orbits

S/076/60/034/008/030/039/XX
B015/B063

are given for illustration. There are 3 references: 1 Soviet and 2 US.

ASSOCIATION: Institut tonkoy khimicheskoy tekhnologii im. M. V. Lomonosova (Institute of Fine Chemical Technology imeni M. V. Lomonosov).
Akademiya nauk SSSR Institut obshchey i neorganicheskoy khimii im. N. S. Kurnakova (Academy of Sciences USSR, Institute of General and Inorganic Chemistry imeni N. S. Kurnakov)

SUBMITTED: December 7, 1958

Card 2/2

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5.3100
5.3700(B)

S/020/60/131/01/031/060
B011/B006

5(4)

AUTHORS: Shustorovich, Ye. M., Dyatkina, M.Ye.

TITLE: The Electron Structures of Chromocene and Some Related Compounds

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 131, Nr 1, pp 113-116 (USSR)

ABSTRACT: The authors calculated the molecular orbitals (MO) of chromocene according to the method by S. S. J. Roothaan (Ref 2) in a generalized form for radicals (Ref 4) (since $(C_5H_5)_2Cr$ possesses unpaired electrons). The simplifications used in reference 1 were also applied in this calculation. The MO of $(C_5H_5)_2Cr$ and their energies are given in table 1. The authors give a scheme of the ground state of chromocene (A). The possibility of a different triplet state (B) in which the two unpaired electrons lie in a twofold degenerate level e_{2g} (higher than the level a'_{1g} occupied by one pair of electrons) is excluded since a self-consistent MO cannot be found for B. Since the calculated energies of the levels e_{2g} and a'_{1g} (-5.22 ev

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The Electron Structures of Chromocene and Some Related Compounds

and -4.62 ev) lie close to each other, the diamagnetic state (see scheme V) must lie in immediate proximity of the ground state. Thus it follows that the observed paramagnetism of chromocene and the absence of an equilibrium between its paramagnetic form and diamagnetic form are due to the difference in the energies of the initial valence states and not to a great difference in the energies of the higher occupied electron levels. These valence states yield the corresponding molecular states A and B (128 kcal and 137 kcal). The latter conclusion evidently holds not only for chromocene, but also for other aromatic complex compounds. In all the molecules investigated by the authors, the higher occupied symmetry levels are e_{2g} and a'_{1g}. The energies of these levels lie very close to each other. In $(C_5H_5)_2Fe$ and $(C_5H_5)_2Co^+$ the e_{2g} levels are above the a'_{1g} levels. In the chromium compounds, inversion occurs (probably due to the greater influence of the donor bonds), so that e_{2g} is lower than a'_{1g}. In aromatic complex compounds these levels evidently verge on an accidental degeneracy (confirmed by refer ence 6). Since these same two levels, the energies

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68817
S/020/60/131/01/031/060
B011/B006

...Electron Structures of Chromocene and ...one Related Compounds

of which lie close to each other (two e_{2g} levels and one a'_{1g} level), the difference between the states characterized by different electron distributions in these levels must be very slight with respect to their MO energies. This confirms an assumption made previously by the authors, i.e., that the number of unpaired electrons in aromatic complex compounds is determined by the difference in the energies of the initial valence states. From the coefficients of the atomic orbitals in the MO of chromocene the following charge distribution is derived: +1.70 of the charge on the Cr atom and -0.17 on every C atom. Thus the Cr atom is much more highly charged than the Fe atom in ferrocene (+0.68). The essential difference in the properties of ferrocene and chromocene is connected with this fact. The similar magnitude of the charge on Cr in the bis-cyclopentadienyl compound on the one hand and the dibenzene compound on the other, together with the noticeably ionic character of chromocene allow the assumption that chromocene is a partly ionic molecule, in which the benzene rings play the

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The Electron Structures of Chromocene and Some Related Compounds

S/020/60/131/01/031/060
B011/B006

part of the unions. There are 3 figures, 1 table, and 10 references, 2 of which are Soviet.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii im. N. S. Kurnakova Akademii nauk SSSR (Institute of General and Inorganic Chemistry imeni N. S. Kurnakov of the Academy of Sciences, USSR)

PRESENTED: October 31, 1959, by I. I. Chernyayev, Academician

SUBMITTED: October 27, 1959

Card 4/4

81727
S/020/60/133/01/39/070
B011/B003

5.3100

AUTHORS: Shustorovich, Ye. M., Dyatkina, M. Ye.

TITLE: The Electron Structure of the Ferricinium Cation and Other Aromatic Complex Compounds of Metals

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 1, pp. 141 - 143

TEXT: The authors calculated the molecular orbits (MO) of the ferricinium cation (Table 1) by using the methods described in previous papers (Refs. 1 and 2) and with the same approximations. Furthermore, they describe the calculation of the MO of the cation $(C_6H_6)_2Cr^+$. They were, however, unable to make a proper selection of structures. Nevertheless, they believe that the first structure (cf. Scheme) is more probable. The authors also attempted a self-consistent calculation of the molecules of $(C_5H_5)_2Co$ and $(C_5H_5)_2V$. They met with considerable difficulties and, therefore, had to restrict themselves to an estimate of the effective charges. The authors met with major difficulties also in

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The Electron Structure of the Ferricinium Cation and Other Aromatic Complex Compounds of Metals

the case of the $(C_5H_5)_2V$ molecule; in this case, they only established the electron configuration of the molecule $...(e_{2g})^2 (a'_{1g})^1$, and restricted themselves to estimating the effective charges. Table 2 offers the results obtained from the calculation of the effective charges on the central atoms and on the rings in all molecules. These results are discussed in the present and previous papers. The authors draw the following conclusions: The distribution of the electron density in the cations as compared to the corresponding neutral molecules corresponds to the detachment of electrons from the rings, since the effective charge of the central atom in all cations does not diverge much from the charge in neutral molecules. Especially indicative are the most reliable data on ferrocene (charge on Fe + 0.7, on the rings 0.35 each) and on the ferricinium cation (+0.6 on Fe and +0.2 on the rings). This result fits those obtained from experiments (according to A. N. Nesmeyanov and E. G. Perevalov; not published). Calculations revealed that in the $(C_6H_6)_2Cr^+$ cation the positive charge is concentrated on the central atom, while the rings have a smaller negative charge. The latter is much

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The Electron Structure of the Ferricinium Cation and Other Aromatic Complex Compounds of Metals

smaller than in dibenzene chromium, so that the passage of $(C_6H_6)_2Cr$ to the cation must be accompanied by a weakening of the tendency toward nucleophilic substitution. The high electron density in ferrocene- and dibenzene chromium molecules and rings is in agreement with the aromatic character of these complexes (Ref. 1). The high π-electron density becomes also manifest in that ferrocene (like benzene) forms molecular compounds with the electron acceptors. It follows from Table 2 that in the case of neutral bis-cyclopentadienyl compounds the effective positive charge on the central atom in the neutral $(C_5H_5)M$ molecules (Z) rises during the early transition period in accordance with the strengthening of the ion character on the transition from vanadicene to chromocene (Ref. 6). This tendency reaches its maximum in the case of $(C_5H_5)_2Mn$, which is known to be an ion compound with a +2 charge on the central atom. This is indicative of the presence of the five unpaired electrons. A further addition of electrons leads to a rapid weakening of the ion character in ferrocene, and especially in cobalticene. The course taken by the charges is shown in Fig. 1. Finally, ruthenocene

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B011/B003

and ruthenicinium are compared with ferrocene and ferricinium. The authors did not receive the paper by R. E. Robertson and H. M. McConnel (Ref. 9) until the time the slips were corrected, and they discuss it therefore in an appendix. There are 1 figure, 2 tables, and 9 references: 6 Soviet, 1 German, and 2 British.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii Akademii nauk SSSR (Institute of General and Inorganic Chemistry of the Academy of Sciences, USSR)

PRESENTED: March 3, 1960, by I. I. Chernyayev, Academician

SUBMITTED: March 1, 1960

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Card 4/4

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S/193/61/002/001/003/006
B101/B201

5.5700 2209 1164 1273 also 1160

AUTHORS: Shustorovich, Ye. M. and Dyatkina, M. Ye.

TITLE: Calculation of the ground states of dibenzene chromium, cobalticinium cation and chromocene by means of molecular orbits with self-consistence

PERIODICAL: Zhurnal strukturnoy khimii, v. 2, no. 1, 1961, 49-58

TEXT: Calculations have been made of the ground state of cobalticinium cation, $(C_5H_5)_2C^+$, of dibenzene chromium, $(C_6H_6)_2Cr$, and of the chromocene, $(C_5H_5)_2Cr$ by the method of C. C. J. Roothaan (Ref. 2, see below). The authors proceeded from the following data: interval Co - C 2.10 A; Cr - C 2.19 A; C - C 1.43 A; effective charge of the Slater orbits: ζ_{2p} 1.6 for C; $\zeta_{4s,\,4p}$ 0.8 for Cr, 1.1 for Co; ζ_{3d} 1.6 for Cr, 2.2 for Co^+. Calculation results are given in Table 5: molecular orbits of the complexes and molecular orbit energies. The lowest orbit is found to be the orbit of a_{1g} symmetry, the highest with ferrocene and cobalticinium e_{2g}, with diben-

Card 1/6

Calculation of ...

zene chromium and chromocene a_{1g}. Levels e_{2g} and a_{1g} have approximately equal energies; thus, in accordance with the experimental data by H. McConnell (Ref. 5, see below) all molecules possess three quasi-degenerate levels. Table 6 compares the calculated ionization potentials of $(C_5H_5)_2Fe$ and $(C_5H_5)_2Cr$ with the measured ones. It is concluded from the relatively good agreement between calculated and measured values that the ionization potential of $(C_6H_6)_2Cr$ probably amounts to 4.19, and that of $(C_5H_5)_2Co^+$ to 11.13 ev. Table 7 presents the distribution of electron density, and Table 8 the allowed transitions. For ferrocene, the transition energy was found to be equal to 2.88, 3.81, and 4.96 ev; for the cobalticinium cation, it was equal to 3.10, 4.00, and 4.77 ev and in good agreement with the ultraviolet spectra. S. N. Dobryakov is thanked for his assistance in the calculations. There are 6 tables and 12 references: 4 Soviet-bloc and 8 non-Soviet-bloc. The 2 references to English language publications read as follows: C. C. J. Roothaan, Rev. Mod. Phys., 23, 69, (1951); H. McConnell, W. W. Borterfield, R. E. Robertson, J. Chem. Phys., 30, 442, (1959).

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B101/B201

Calculation of ...

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M. V. Lomonosova (Moscow Institute of Fine Chemical Technology imeni M. V. Lomonosov); Institut obshchey i neorganicheskoy khimii AN SSSR im. N. S. Kurnakova (Institute of General and Inorganic Chemistry imeni N. S. Kurnakov of AS USSR)

SUBMITTED: February 14, 1960

Legend to Table 5: 1) symmetry; 2) molecule; 3) binding molecular orbits; a) type of orbit; b) energy (ev); 4) loosening orbits
Legend to Table 6: 1) potential; 2) calculated; 3) measured
Legend to Table 7: 1) compound; 2) effective charges (in atomic units); a) at the central atom; b) at both rings; c) at one ring; d) at every C atom; 3) dipole moments (in D); e) bond metal - C; f) metal - ring
Legend to Table 8: 1) single electron transition; 2) excited states of the molecules; a) orbital degeneracy (without consideration of electron - electron interaction); b) symmetry of the states (under consideration of electron - electron interaction); 3) allowed transitions.

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Calculation of

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① Симметрия	② Молекула	③ Связывающие МО: Вид орбиты	③ Связывающие МО: Энергия (эв)	④ Разрыхляющие МО: Энергия (эв)
a_{1g}	$Co(C_5H_5)_2^+$ $Cr(C_5H_5)_2$ $Cr(C_6H_6)_2$	$0{,}79a_{1g}+0{,}62s$ $0{,}97a_{1g}+0{,}25s$ $0{,}98a_{1g}+0{,}22s$	−20,84 −13,71 −13,31	−5,33 +1,74 +3,21
a'_{1g}	$Co(C_5H_5)_2^+$ $(CrC_5H_5)_2$ $Cr(C_6H_6)_2$	d_{z^2} d_{z^2} d_{z^2}	−13,20 − 4,82 − 4,19	— — —
a_{1u}	$Co(C_5H_5)_2^+$ $Cr(C_5H_5)_2$ $Cr(C_6H_6)_2$	$0{,}91a_{1u}+0{,}41p_z$ $0{,}99a_{1u}+0{,}06p_z$ $0{,}99a_{1u}+0{,}062p_z$	−18,04 −13,12 −12,73	−5,20 +3,73 +2,15
e_{1u}	$Co(C_5H_5)_2^+$ $Cr(C_5H_5)_2$ $Cr(C_6H_6)_2$	$0{,}77e_{1u}+0{,}64p_x$ $0{,}94e_{1u}+0{,}35p_x$ $0{,}94e_{1u}+0{,}36p_x$	−16,65 −9,87 −10,72	−1,96 +4,05 +3,84
e_{1g}	$Co(C_5H_5)_2^+$ $Cr(C_5H_5)_2$ $Cr(C_6H_6)_2$	$0{,}90e_{1g}+0{,}44d_{xz}$ $0{,}92e_{1g}+0{,}39d_{xz}$ $0{,}96e_{1g}+0{,}30d_{xz}$	−14,20 −10,56 −10,61	+0,19 +7,94 +10,12
e_{2g}	$Co(C_5H_5)_2^+$ $Cr(C_5H_5)_2$ $Cr(C_6H_6)_2$	$0{,}32e_{2g}+0{,}95d_{xy}$ $0{,}55e_{2g}+0{,}83d_{xy}$ $0{,}78e_{2g}+0{,}63d_{xy}$	−11,13 −5,22 −4,76	+0,57 +5,88 +6,97
e_{2u}	$Co(C_5H_5)_2^+$ $Cr(C_5H_5)_2$ $Cr(C_6H_6)_2$	e_{2u} e_{2u} e_{2u}	— — —	−0,27 +4,00 +2,19

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B101/B201

Calculation of ...

(1) Потенциал	$(C_5H_5)_2Fe$	$(C_5H_5)_2Cr$
(2) Вычисленный	6,39	4,82
(3) Измеренный	7,05	6,90

Table 4

(1) Соединение	(2) Эффективные заряды (в атомных единицах)				(3) Дипольные моменты (в D)	
	на центральном атоме (a)	на обоих кольцах (b)	на одном кольце (c)	на каждом атоме C (d)	(e) связи металл — C	металл — кольцо (f)
$(C_6H_6)_2Cr$	+1,470	−1,470	−0,735	−0,122	1,30	5,90
$(C_5H_5)_2Fe$	+0,682	−0,682	−0,341	−0,068	0,57	2,64
$(C_5H_5)_2Cr$	+1,700	−1,700	−0,850	−0,170	1,80	7,40
$(C_5H_5)_2Co^+$	−0,118	+1,118	+0,559	+0,112		

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Calculation of ...

Table 8

④ Одноэлектронный переход $\varphi_i \to \varphi_a$	⑤ Возбужденные состояния молекул: ⑥ Орбитальное вырождение *	⑤ Возбужденные состояния молекул: ⑦ Симметрия состояний **	⑧ Разрешенные переходы
$e_{2g} \to e'_{1u}$	4	$E_{1u} + E_{2u}$	$^1A_{1g} \to {}^{1,3}E_{1u}$
$e_{2g} \to e_{2u}$	4	$A_{1u} + A_{2u} + E_{1u}$	$^1A_{1g} \to {}^{1,3}A_{1u}\,{}^{1,3}E_{1u}$
$a'_{1g} \to a'_{1u}$	1	A_{1u}	$^1A_{1g} \to {}^{1,3}A_{1u}$
$a'_{1g} \to e'_{1u}$	2	E_{1u}	$^1A_{1g} \to {}^{1,3}E_{1u}$

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SHUSTOROVICH, Ye.M.; DYATKINA, M.Ye.

Effective charge on the Ni atom in the nickelecinium cation.
Zhur.neorg.khim. 6 no.5:1247-1248 My '61. (MIRA 14:4)

(Nickel compounds)

SHUSTOROVICH, Ye.M.

Nature of chemical bond in carbonyls and nitrosyls of transition metals. Zhur.strukt.khim. 3 no.1:103-105 Ja-F '62. (MIRA 15:3)

1. Institut obshchey i neorganicheskoy khimii imeni N.S.Kurnakova AN SSSR.

(Transition metal compounds) (Chemical bonds)

31803
S/192/62/003/003/005/006
D228/D307

11,4400

AUTHORS: Shustorovich, Ye. M. and Dyatkina, M. Ye.

TITLE: Electronic structure of the ferrocene molecule

PERIODICAL: Zhurnal strukturnoy khimii, v.3, no. 3, 1962, 345-346

TEXT: The authors compare data previously obtained by them (Ye.M. Shustorovich et al, Dokl. AN SSSR, 128, 1234, 1959) about the electronic structure of the ferrocene molecule $(C_2H_5)_2Fe$, with those of the Danish scientists J. P. Dahl and C. J. Ballhausen, in order to verify the results of both sets of calculations. The items discussed include: The ionization potential; the electron density distribution; the energy of the $3d_{z^2}$ orbit; the MO sequence; and the energies of single electron transfers. They conclude that their calculations agree best with the experimental evidence.

Card 1/2

SHUSTOROVICH, Ye.M.

Electronic structure and properties of cumulated systems. Part 1. International barriers to rotation in organic cumulenes. Zhur.strukt. khim. 4 no.4:642-645 Jl-Ag '63. (MIRA 16:9)

1. Institut obshchey i neorganicheskoy khimii imeni N.S.Kurnakova AN SSSR.

(Cumulenes) (Double bonds)

SHUSTOROVICH, Ye.M.

Electronic structure and properties of cumulated systems. Part 2: Elasticity and energy spectrum of inorganic cumulenes. Zhur. strukt.khim. 4 no.5:773-776 S-O '63. (MIRA 16:11)

1. Institut obshchey i neorganicheskoy khimii imeni N.S.Kurnakova AN SSSR.

[redacted]

Electronic structure and properties of cumulated systems. Part 3. Effects of interelectron interaction in organic cumulenes. Zhur.strukt.khim. 5 no. 2:325-329 Mr-Ap '64. (MIRA 17:6)

... Institut obshchey i neorganicheskoy khimii imeni N.S. Kurnakova AN SSSR.

SHUSTOROVICH, Ye.M.

Some possible properties of oxidonitrides, oxidoborides, and nitridoborides of transition elements. Zhur. strukt. khim. 5 no.3:470-473 My-Je '64. (MIRA 18:7)

1. Institut obshchey i neorganicheskoy khimii imeni N.S. Kurnakova AN SSSR.

L 24187-65 EWT(m)/EWT(c)/EWP(j) Pc-4/Pr-4 RM

ACCESSION NR: AP4047637 S/0192/64/005/005/0770/0776

AUTHOR: Shustorovich, Ye. M.; Popov, N. A.

TITLE: Electronic structure and properties of cumulate systems
4. Some characteristics of systems containing mutually perpendicular π-bonds

SOURCE: Zhurnal strukturnoy khimii, v. 5, no. 5, 1964, 770-776

TOPIC TAGS: electronic structure, cumulated organic system, perpendicular π bond, self consistent molecular orbit, ionization potential, electron affinity, structural chemistry, allene, acetylene

ABSTRACT: In a previous work (Zh. Struct. Khimii 5, 325 (1964)) the authors offered a general consideration concerning the structure of organic cumulens $H_2C(=C=)_nCH_2$, by using the method of self-consistent molecular orbits in the J. A. Pople's approximation (Trans. Faraday Soc. 49, 1375 (1953)). By using the results of the former work, in the present paper expressions are given for the ionization potentials of allene and acetylene which are compared with that of

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L 24187-65

ACCESSION NR: AP4047637

2

ethylene. Expressions are also found for the ionization potentials and electron affinities for the organic cumulens with n=1, 2, 3, and ∞, and the results are generalized for the case of infinite chains of organic polyacetylenes $H(-C{=}C-)_{\infty}H$ and inorganic cumulenes $(=A{=}B=)_{\infty}$. Orig. art. has: 1 table, and 13 equations.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii im. N. S. Kurnakova AN SSSR (Institute of General and Inorganic Chemistry, AN SSSR)

SUBMITTED: 27May64 ENCL: 00

SUB CODE: EC, OC NO REF SOV: 005 OTHER: 012

Card 2/2

KRUGLYAK, Yu.A.; WITMAN, D.R.[Whitman, D.R.]; SHUSTOROVICH, Ye.M., otv. red.

[Tables of quantum chemistry integrals] Tablitsy integralov kvantovoi khimii. Moskva, Vychislitel'nyi tsentr. Vol.1. 1963. 439 p. (MIRA 18:5)

1. Khar'kovskiy gosudarstvennyy universitet, Kafedra fizicheskoy khimii Instituta fizicheskoy khimii AN Ukr.SSR (for Kruglyak).

SHUSTOROVICH, Ye.M.

Electron structure and properties of cumulated systems. Part 5: Alternation of bonds in organic cumulenes and polyacetylenes. Zhur. strukt. khim. 6 no.1:123-127 Ja-F '65. (MIRA 18:12)

1. Institut obshchey i neorganicheskoy khimii imeni N.S. Kurnakova AN SSSR. Submitted October 12, 1964.

POPOV, N.A.; SHUSTOROVICH, Ye.M.

Electronic structure and properties of cumulated systems. Part 6: Effect of an interelectronic interaction on the energy gap in the π-electronic spectrum of long polyacetylenes and polyenes. Zhur. strukt. khim. 6 no.2:286-290 Mr-Ap '65. (MIRA 18:7)

1. Institut obshchey i neorganicheskoy khimii AN SSSR imeni Kurnakova.

POPOV, N.A.; SHUSTOROVICH, Ye. M.

Electronic structure and properties of cumulated systems. Part 7: Self-consistent circuit of π-MO according to Ople's method. Zhur. strukt. khim. 6 no. 4:596-599 Jl-Ag '65 (MIRA 19:1)

1. Institut obshchey i neorganicheskoy khimii AN SSSR imeni N.S. Kurnakova. Submitted April 4, 1965.

SHUSTOROVICH, Ye.M.

Electronic structure and properties of cumulated systems. Part 8: Comparison of the effects of alternating bonds in infinitely long polyenes and polyacetylenes. Zhur. strukt. khim. 6 no. 4:600-603 Jl-Ag '65 (MIRA 19:1)

1. Institut obshchey i neorganicheskoy khimii imeni N.S.Kurnakova AN SSSR. Submitted May 4, 1965.

ZYAZEV, V., inzhener; SHUSTOV, A., inzhener.

Intercity automotive transportation in Poland. Avt.transp. 35 no.3:39 Mr '57. (MLRA 10:5)
(Poland--Transportation, Automotive)

ZYAZEV, V.; MALYSHEV, A.; SHUSTOV, A.

Develop and improve intercity freight haulage by means of small shipments. Avt. transp. 35 no.5:10-13 My '57. (MLRA 10:6)
(Transportation, Automotive)

BASIN, S.; ZYAZEV, V.; SMIRNOV, O.; SHUSTOV, A.

Organizing centralized intercity freight haulage by means of public automotive transportation. Avt. transp. 36 no. 6:4-9 Je '58. (MIRA 11:7)

(Transportation, Automotive)

ZYAZEV, V.; KAMENSKAYA, A.; MALYSHEV, A.; SHUSTOV, A.

Using the system of closed circuits in organizing interurban freight haulage. Avt.transp. 38 no.9:11-14 S '60. (MIRA 13:9)
(Transportation, Automotive)

MALYSHEV, A.; SHUSTOV, A.; YUDOV, V.

Organizing technical assistance for motor vehicles on highways. Avt. transp. 41 no.5:23-24 My '63. (MIRA 16:10)

(Motor vehicles--Maintenance and repair)

SHUSTOV, A.

Improve transportation of perishable products. Avt.transp. 41 no.11:13-17 N '63. (MIRA 16:12)

1. Nachal'nik sektora gruzovykh perevozok otdela ekonomiki i organizatsii perevozok Nauchno-issledovatel'skogo instituta avtomobil'nogo transporta.

[illegible]

Cerebellar syndrome in tumors of the brainstem. Zhur. nevr. i psikh. 65 no.6:817-820 '65. (MIRA 18:6

1. Klinika nervnykh bolezney i neyrokhirurgii (zaveduyushchiy - prof. D.G. Shefer) Sverdlovskogo meditsinskogo instituta.

8(0) SOV/112-58-3-4050

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1958, Nr 3, p 83 (USSR)

AUTHOR: Shustov, A. D.

TITLE: Study of Operation of a Soviet Multiblade Chopping Machine and Methods for Selecting the Driving Motor (Izucheniye raboty otechestvennoy mnogonozhevoy rubitel'noy mashiny i metodika vybora privodnogo elektrodvigatelya)

PERIODICAL: V sb.: Bumagodelat. mashinostroyeniye. Nr 5, M.-L., Mashgiz, 1956, pp 5-13

ABSTRACT: The chopping machine is used in pulp-and-paper industry for grinding up wood before it is fed to the boilers. Results of power tests of the MRMN-20 chopping machine conducted by NIIBUMMAShEM in 1955 are presented. From studies of retardation curves of the machine and electric motor, the flywheel masses of the unit were determined; the curves of static-resistance torque vs. speed for various numbers of beaters were obtained for both no-load and full-

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SOV/112-58-3-4050

8(0)

Study of Operation of a Soviet Multiblade Chopping Machine and Methods for . . . .

load conditions. On the basis of the above test data, various load diagrams were constructed for pulpwood chopping; the influence of the load curve, length of the pulpwood, rpm, and flywheel torque upon the driving-motor capacity is analyzed.

B.S.B.

Card 2/2

SHUSTOV, A.D.

Testing the performance and capacity of a four-knife chipper and comparing its characteristics with a ten-knife machine. Bumagodel.mash. no.6:5-19 '58. (MIRA 13:8)
(Woodworking machinery)

SHUSTOV, A.D.

Determining the mechanical characteristics of Soviet conical mills and methods of selecting and electric driving motor. Bumagodel. mash. no.6:20-30 '58. (MIRA 13:8)
(Woodpulp industry--Equipment and supplies)

SHUSTOV, A.D.

Study of the deformations of condenser paper in the machine and required specifications of the electric drive. Bumagodel.mash. no.6:138-168 '58. (MIRA 13:8)
(Papermaking machinery)

SHUSTOV, A.D., inzh.

Dynamics of the extension of paper in a machine. Bum.prom. 33 no.11:7-9 N '58. (MIRA 13:8)

1. Nauchno-issledovatel'skiy institut po proyektirovaniyu bumagodelatel'nykh mashin.
(Papermaking machinery)

SHUSTOV, A.D.

Experimental evaluation of the necessary adjustment precision of the section speed regulators in manufacturing newsprint. (MIRA 13:5)
Bumagodel.mash. no.7:29-49 '59.
(Newsprint)
(Papermaking machinery)

SHUSTOV, A.D.

Tension of tissue paper on the machine and performance quality of the section speed regulators. Bumagodel.mash. no.7:50-63 '59. (MIRA 13:5)

(Paper) (Papermaking machinery)

SHUSTOV, A.D., inzh.

On the static accuracy of speed regulators of electric drive sections of paper-aking machines. Bu..prom. 34 no.7:7-9 Jl '59. (MIRA 12:10)

1. Nauchno-issledovatel'skiy institut po proyektirovaniyu bumagodelatel'nykh mashin.
(Paper-making machinery--Electric driving)

SHUSTOV, A.D.

PHASE I BOOK EXPLOITATION SOV/4553

Vsesoyuznoye ob"yedinennoye soveshchaniye po avtomatizatsii proizvodstvennykh protsessov v mashinostroyenii i avtomatizirovannomu elektroprivodu v promyshlennosti. 3d, Moscow, 1959

Elektroprivod i avtomatizatsiya promyshlennykh ustanovok; trudy soveshchaniya (Electric Drive and Automation in Industrial Systems; Transactions of the Conference) Moscow, Gosenergoizdat, 1960. 470 p. 11,000 copies printed.

General Eds.: I.I. Petrov, A.A. Sirotin, and M.G. Chilikin; Eds.: I.I. Sud, and E.F. Silayev; Tech. Eds.: K.P. Voronin, and G.Ye. Larionov.

PURPOSE: The collection of reports is intended for the scientific and technical personnel of scientific research institutes, plants and schools of higher education.

COVERAGE: The book is a collection of reports submitted by scientific workers at plants, scientific institutes and schools of higher education at the third Joint All-Union Conference on the Automation of Industrial Processes in Machine Building and Automated Electric Drives in Industry held in Moscow on May 12-16, 1959. The Conference was called by the Academy of Sciences USSR, the Gosplan SSSR (State Planning Commission USSR), the GNTK SSSR, the Gosudarstvennyy Komitet po avtomatizatsii i mashinostroyeniyu (State Committee on Automation and Machine Building) and the Natsional'nyy Komitet SSSR po avtomaticheskomu upravleniyu (USSR National Committee on Automatic Controls) and prepared by the Nauchno-tekhnicheskiy komitet po avtomatizirovannomu elektroprivodu (Scientific and Technical Committee on Automated Electric Drives), the MEI (Moscow Institute of Energetics), the VNIIEM, the IAT (Institute of Automation and Telemechanics) of the Academy of Sciences USSR, and the Komissiya po tekhnologii mashinostroyeniya Instituta mashinovedeniya AN SSSR (Commission on the Technology of Machine Building of the Institute of Science of Machines of the Academy of Sciences USSR). It was the purpose of the Editorial Board to arrange the reports in a way which would ensure a relatively systematic presentation of theoretical and practical problems relating to electric drives and automatic controls of industrial mechanisms used in various branches of industry. Basic problems of automated electric drive and their solution are outlined. The book also contains articles on electric machinery and means of automation. Considerable attention is paid to noncontact automatic control systems, including systems with semiconductor devices and magnetic amplifiers, and to computers intended both for the analysis and the synthesis of linear and nonlinear automatic regulation and control systems. Reports already published in journals or official publications have been considerably abbreviated; those which have appeared in volume V of NII EP transactions or in the journal "Elektrichestvo" are marked with an asterisk. No personalities are mentioned. References accompany some of the papers.

PART I. GENERAL PROBLEMS CONCERNING THE THEORY AND PRACTICE OF ELECTRIC DRIVE AND AUTOMATION OF CONTROL

17

SHUSTOV, A.D.

Determining the precision of the measuring element of speed regulators in machine sections. Bumagodel. mash. no.8:79-88 '60.
(MIRA 14:3)
(Papermaking machinery)

SHUSTOV, A.D.

Dynamic properties required for the regulators of an automated electric drive of paper making machines. Bumogodel. mash. no.8:96-118 '60. (MIRA 14:3)

(Papermaking machinery)
(Automatic control)

SHUSTOV, A.D.

Study of a speed-regulating system of a section with an electronic amplifier. Bumagodel.mash. no.9:111-145 '61. (MIRA 15:1)
(Papermaking machinery)

KULIKOVSKIY, Petr Konstantinovich, kand. tekhn.nauk; SHUSTOV, Aleksandr Dmitriyevich, inzh.; VOL'MAN, N.S., red.; SOBOLEVA, Ye.M., tekhn. red.

[Electric drives for machinery in the cellulose and paper-making industry]Elektroprivod mashin tselliulozno-bumazhnoi promyshlennosti. Moskva, Gosenergoizdat, 1962. 371 p. (MIRA 16:4)
(Cellulose)
(Paper-making machinery--Electric driving)

BARYSHNIKOV, Vladimir [illegible]triyevich; SHUSTOV, A.D., red.

[Automatic electric drives of modern highly efficient lengthwise cutting machines for paper and cardboard] Avtomatizirovannye elektroprivody sovremennykh vysokoproizvoditel'nykh prodol'no-rezatel'nykh stankov dlia bumagi i kartona. Leningrad, 1964. 37 p. (Leningradskii dom nauchno-tekhnicheskoi propagandy. Obmen peredovym opytom. Seriia: Promyshlennaia energetika i gazifikatsiia predpriiatii, no.1) (MIRA 17:7)

SHUSTOV, A.D.

Studying the speed regulation system for sections with a dynamo-electric amplifier-generator of the section electric motor. Bumagodel. mash. no.11:175-215 '63. (MIRA 17:6)

SHUSTOV, A.D.

Dynamics of the travel of the paper sheet on papermaking machines. Bumagodel. sbsb. no.12:134-137 '64.

Rheological properties of paper and their effect on the requirements toward the electric drive of papermaking machines. Ibid.:148-170.
(MIRA 17:11)

V'YUKOV, Ivan Yelizarovich; SHUSTOV, A.D., red.

[Automatic control systems of the electric drives of papermaking machines] Sistemy avtomaticheskogo regulirovaniia elektroprivodov bumagodelatel'nykh mashin. Moskva, Lesnaia promyshlennost', 1965. 214 p.
(MIRA 18:9)

SHUSTOV, A.I.

Methodology for the preparation of carmine fro phagocyte tests. Lab. delo no.9:531-533 '64. (MIRA 17:12)

1. Kafedra voyenno-morskoy i radiatsionnoy gigiyeny (nachal'nik-prof. N.I. Pobrov) Voyenno-meditsinskoy ordena Lenina akademii im. S.M. Kirova, Leningrad.

SHUSTOV, A.I.

First operational year of Moscow boarding schools. Gor.khoz.Mosk. 31 no.7:25-27 Jl '57. (MLRA 10:9)

1. Zaveduyushchiy Moskovskim gorodskim otdelom narodnogo obrazovaniya.
(Moscow--Boarding schools)

SHUSTOV, A.I.

Reorganization of Soviet schools. Gor.khoz.Mosk. 33 no.6:18-21 Je '59. (MIRA 12:10)

1. Zaveduyushchiy Moskovskim gorodskim otdelom narodnogo obrazovaniya.

(Education)

SHUSTOV, A.I.

Let's carry out the law concerning the reorganization of schools.
Gor. Khoz. Mosk. 34 no.9:7-8 S '60. (MIRA 13:9)

1. Zaveduyushchiy Moskovskim gorodskim otdelom narodnogo obrazovaniya.
(Moscow--Education)

KRYLOV, Viktor Ivanovich; FEDOSEYEV, Gennadiy Aleksandrovich; SHUSTOV, Artur Petrovich; POTEMKINA, N.S., red.

[Pinnipedia of the Far East] Lastonogie Dal'nego Vostoka. Moskva, Pishchevaia promyshlennost', 1964. 57 p. (MIRA 17:12)

DRUYAN, Ya.M.; BERGMAN, Ya.I.; SUKHOTIN, M.D.; SHUSTOV, A.S., otv. za vypusk; GALAKTIONOVA, Ye.N., tekhn.red.

[Organization of the centralized direction of automotive freight transportation in Leningrad] Opyt organizatsii tsentralizovannogo rukovodstva gruzovymi avtomobil'nymi perevozkami v Leningrade. Moskva, Nauchno-tekhn.izd-vo avtotransp.lit-ry, 1958. 44 p. (MIRA 12:6)
(Leningrad--Transportation, Automotive)

SHUSTOV, A.S.

Methods for the determination of cost of haulage and the establishment of rates for interurban freight transportation. Trudy MIEI no. 20:82-91 '63. (MIRA 17:3)

GINZBURG, S.I., inzh. (Kaluzhskaya oblast'); SHUSTOV, B.A., inzh. (Kaluzhskaya oblast')

Rapid construction of a compressor station. Stroi. truboprov. 5 no.4:13-15 Ap '60. (MIRA 13:9)
(Gas, Natural--Pipelines)

SHUSTOV, B.S

Krymskaia ASSR. [Crimean ASSR]. Moskva, Planovoe khoziaistvo, 1927. 63 p. illus. maps (1 fold). (Ekonomiko-geograficheskie ocherki SSSR, kn. 9. Raiony Evropeiskoi chasti SSSR, vyp. 9).
Bibliography: p. [59].
Transportation and electrification (p. 45).

DLC: HC337.C7S5

SO: Soviet Transportation and Communication, A Bibliography, Library of Congress, Reference Department, Washington, 1952, Unclassified.

SHUSTOV, B. S.

Geography - Study and Teaching

Work in the geography study yard and in the surrounding countryside. Geog. v shkole, No. 4, 1952.

9. Monthly List of Russian Accessions, Library of Congress, October 1952 Uncl.

SHUSTOV, B.S.

Organization of a school phenological network in Ryazan Province; results of its work during the past five years. Vop.geog. no.37: 60-65 '55. (MLRA 8:12)
(Geography--Study and teaching) (Kolosovskii, Nikolai Nikolaevich, 1891-1954)

SHUSTOV, B.S., dotsent

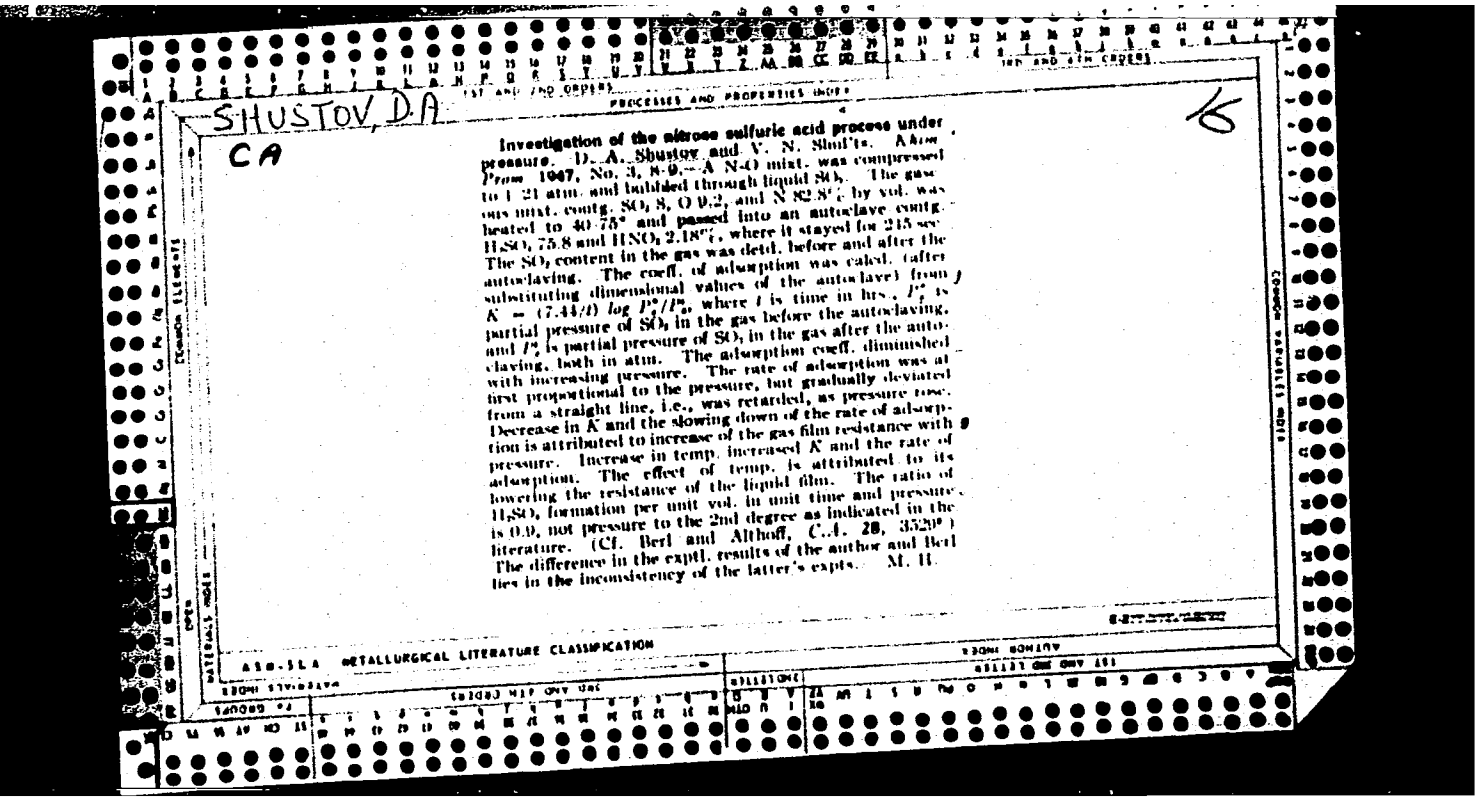
Organization of geography plots and school phenological observations in Ryazan Province. Uch.zap.RGPI 13:235-245 '56.
(MIRA 12:8)

(Ryazan Province--Nature study)

BATMANOV, V. A. (Sverdlovsk), Dotsent B. S. Shustov, (Ryazan'); Dotsent A. Kh. Shklyar (Minsk); A. G. Remizov (Moscow) and others.

"Phenological Maps."

report presented at a Phenological Conference, Leningrad Nov. 1957, by the USSRGeographical Soc.



SHUSTOV, D.A.

CA

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Investigation of the nitrose sulfuric acid process under pressure. D. A. Shustov and V. N. Sinol'ts. *Azot. Prom.* 1967, No. 3, 8-9.—A N-O mixt. was compressed to 1.21 atm. and bubbled through liquid SO_3. The gas mix. contg. SO_2 8, O_2 9.2, and N 82.8% by vol. was heated to 40-75° and passed into an autoclave contg. H_2SO_4 75.8 and HNO_3 2.18%, where it stayed for 215 sec. The SO_2 content in the gas was detd. before and after the autoclaving. The coeff. of adsorption was calcd. (after substituting dimensional values of the autoclave) from $K = (7.44/t) \log P_1^o/P_2^o$, where t is time in hrs., P_1^o is partial pressure of SO_2 in the gas before the autoclaving, and P_2^o is partial pressure of SO_2 in the gas after the autoclaving, both in atm. The adsorption coeff. diminished with increasing pressure. The rate of adsorption was at first proportional to the pressure, but gradually deviated from a straight line, i.e., was retarded, as pressure rose. Decrease in K and the slowing down of the rate of adsorption is attributed to increase of the gas film resistance with pressure. Increase in temp. increased K and the rate of adsorption. The effect of temp. is attributed to its lowering the resistance of the liquid film. The ratio of H_2SO_4 formation per unit vol. in unit time and pressure is 0.9, not pressure to the 2nd degree as indicated in the literature. (Cf. Berl and Althoff, *C.A.* **28**, 3520^9.) The difference in the exptl. results of the author and Berl lies in the inconsistency of the latter's expts. M. H.

SHUSTOV,D.A., kandidat tekhnicheskikh nauk; SHUL'TS,V.N., professor, doktor tekhnicheskikh nauk [deceased]

Study of the nitrosyl-sulfuric acid pressure process. Khim.prom. no.3:72-73 Mr'47. (MLRA 8:12)
(Sulfurinc acid industry)

SHUTOV, E.G.

Imbedding of semigroups in simple semigroups with one-sided division. Izv. vys. ucheb. zav.; mat. no.5:143-148 '64.

(MIRA 17:12)

AUTHOR: Shustov, G.I. SOV/128-58-11-7/24

TITLE: A System of Automation of Multi-Operation Cyclic Production Processes (Skhema avtomatizatsii mnogooperatsionnykh tsiklicheskikh proizvodstvennykh protsessov)

PERIODICAL: Liteynoye proizvodstvo, 1958, Nr 11, pp 12-13 (USSR)

ABSTRACT: An automation system, based on the use of an electronic time-relay, for a series of subsequent switching-on of current collectors, is suggested for mixture loading into runners. The suggested method was tested at the laboratory of the Ural'skiy politekhnicheskiy institut im. S.M. Kirova (Ural Polytechnical Institute imeni S.M. Kirov). A detailed description of the semi-automatic, automatic and manual operations of the proposed system is given.
There is one circuit diagram and one Soviet reference.

1. Industrial equipment--Automation 2. Electronic equipment
3. Electronic relays--Performance

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SHUSTOV, G.I.; PRASOV, Ye.M.

Using noncontact elements in the automatic system of bunker charging. Avtom.i prib. no.3:3-6 Jl-S '62. (MIRA 16:2)

1. Ural'skoye otdeleniye Vsesoyuznogo nauchno-issledovatel'skogo instituta mekhanicheskoy obrabotki poleznykh iskopayemykh.
(Ore dressing--Equipment and supplies)
(Electronic control)

FAFURIN, N.; SHUSTOV, I., inzh., kapitan dal'nego plavaniya

Auxiliary bridle used in towing. Mor.flot 19 no.3:39-41 Mr '59. (MIRA 12:4)

1. Nachal'nik Leningradskogo glavmoragentstva "Inflot" (for Fafurin).

(Towing--Equipment and supplies)

SHUSTOV, I., mayor

Sliding weight for the anchor chain. Mor.flot 21 no.1:44-45 Ja '61. (MIRA 14:6)

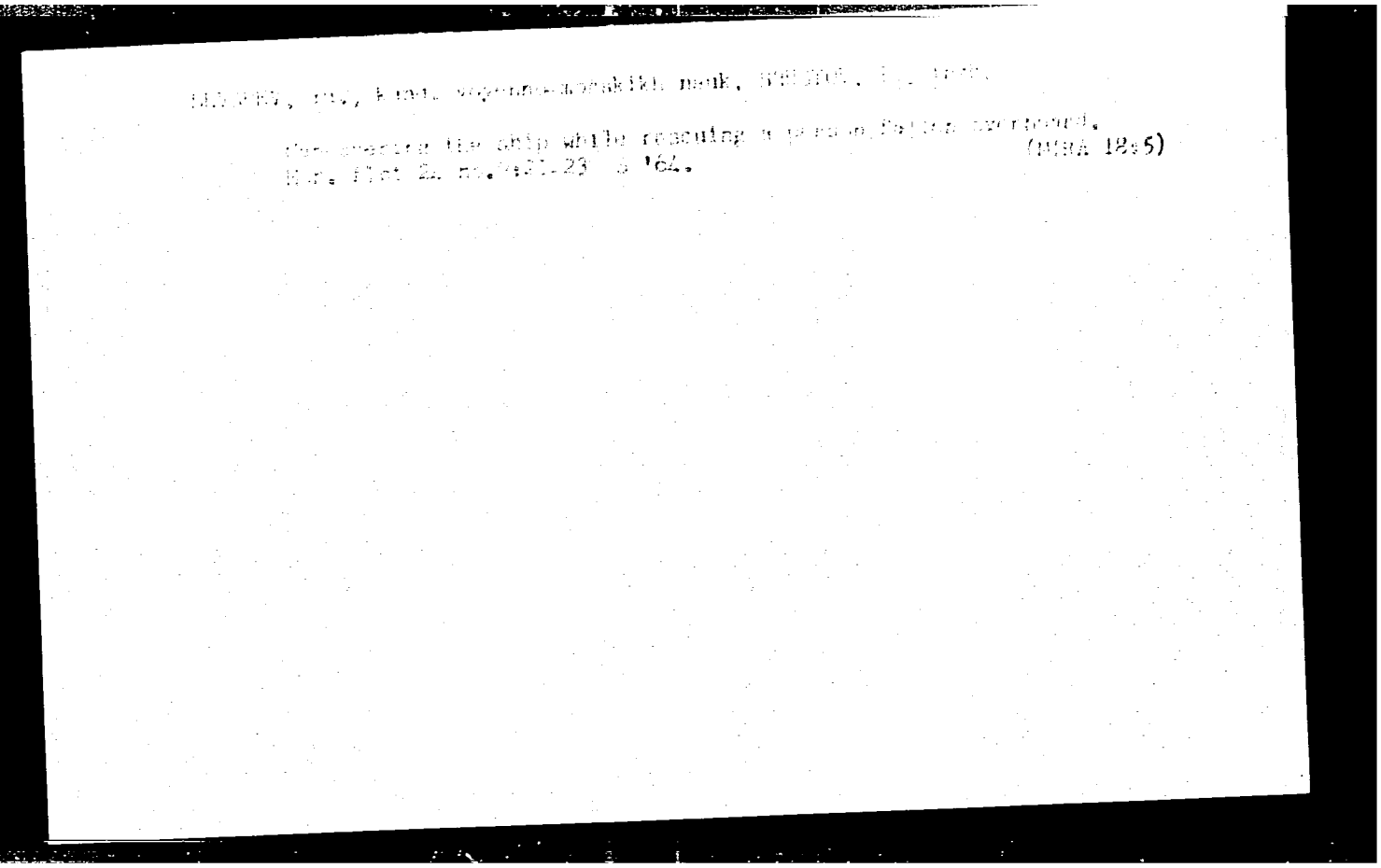
(Great Britain--Anchors)

SHVAREV, Yu., kand.voyenno-morskikh nauk; SHUSTOV, I., mayor

Effectiveness of the maneuver executing the order "man overboard."
Mor.flot 21 no.3:17 Mr '61. (MIRA 14:6)
(Navigation)
(Rescue work)

SHUSTOV, I.

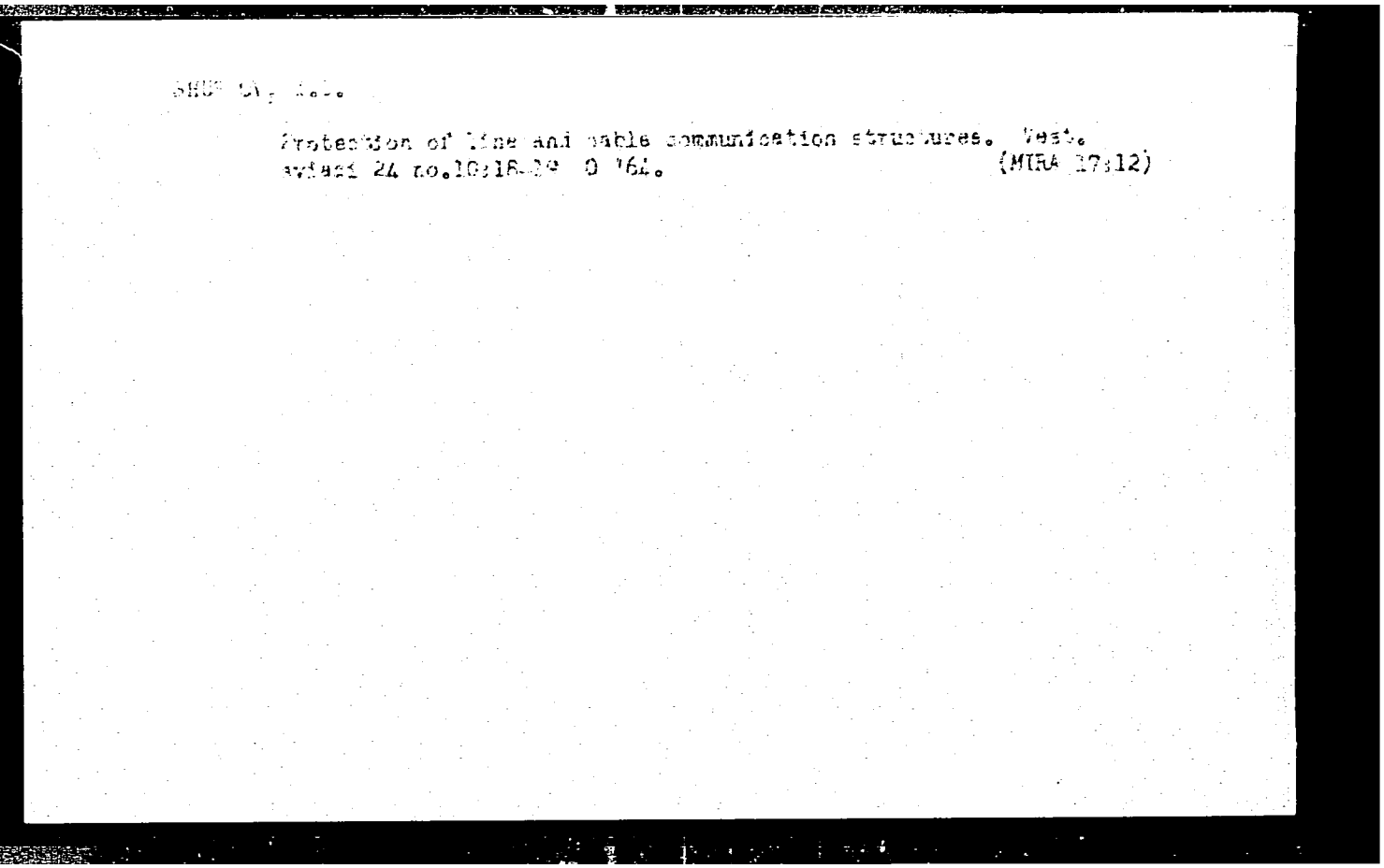
Ship derricks and booms [from "Shipping World"]. Mor. flot 21 no.9:44 S '61. (MIRA 14:9)
(Ships--Equipment and supplies)



[illegible], V., agronom po zashchite rasteniy (Tarasovskiy rayon, Kiyevskoy [illegible]); BURLAKOV, A.; SHUSTOV, I.; LAGODINSKIY, Yu., nauchnyy [illegible]

Sadovod' i ogorod. Zashch.rast.ot vred.i bol. 10 no.4:17 '65. (MIRA 18:6)

1. Glavnyy agronom po zashchite rasteniy, Kzyltuskiy rayon, Kokchetavskoy oblasti (for Burlakov). 2. Nachal'nik Odesskoy stantsii zashchity rasteniy (for Shustov). 3. Ukrainskiy nauchno-issledovatel'skiy institut zashchity rasteniy (for Lagodinskiy).



Protection of line and cable communication structures. Vest.
svyazi 24 no.10:18-[illegible] O '64. (MIRA 17:12)

SHUSTOV, K.S.

From the history of the struggle of the Cuban people against the Spanish colonial rule (1895-1898). Vest. AN Kazakh. SSR 20 no.1:39-46 Ja '64. (MIRA 17:3)

ACC NR: AP6000520 SOURCE CODE: UR/0142/65/008/005/0550/0560

AUTHOR: Vakin, S. A.; Krivitskiy, B. Kh.; Shustov, L. N.

ORG: none

TITLE: Direction-finding characteristics of monopulse automatic-tracking systems

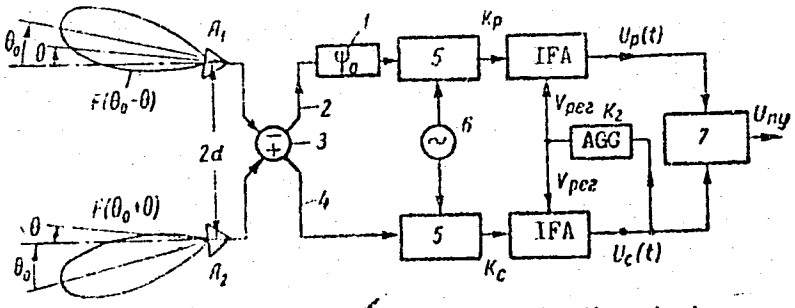
SOURCE: IVUZ. Radiotekhnika, v. 8, no. 5, 1965, 550-560

TOPIC TAGS: monopulse radar, automatic tracking

ABSTRACT: The well-known Hellgren's direction-finding characteristics are based on ideal operation of the AGC system. Under real conditions, the phase-detector output voltage depends on the strength of the input signal. The present article develops formulas describing the direction-finding characteristics with an allowance for the real AGC-system operation. A generalized scheme (see figure below) is considered: Both amplitude and phase direction-finding characteristics show that the major-lobe width is independent of the AGC equivalent transfer factor ρ. This factor, however, has an essential influence on the slope of the direction-finding characteristics and on the spacing between the maxima when $\rho < 10-20$. With

Card 1/2 UDC: 621.396.96

ACC NR: AP6000520



Functional diagram of the direction-finding device of a monopulse radar; 1 - delay system, 2 - difference, 3 - hybrid ring, 4 - sum, 5 - mixer, 6 - heterodyne, 7 - phase detector; IFA - IF amplifier, AGC - automatic gain control

$\sigma > 20-30$, the shape of the direction-finding characteristic depends only slightly on the input-signal amplitude and AGC parameters. The direction-finding system is linear (with a variable slope) only for small angular displacements of the target from the equisignal line. Orig. art. has: 11 figures and 40 formulas.

SUB CODE: 17 / SUBM DATE: 24Oct63 / ORIG REF: 003

Card 2/2

SHUSTOV, M. B.

"Determination of Vanadium in Metallic Titanium"

submitted at the Conference on Kinetic Methods of Analysis, Ivanovo, 14-16 June 1960

So: Izvestiya Vysshikh Uchebnykh Zavedeniy SSSR, Khimiya i Khimicheskaya Technologiya, Vol III, No 6 Ivanovo, 1960, pages 1113-1116.

SHUSTOV, M.I., inzh.

Characteristics of the volumetric pickup of liquid level.
Priborostroenie no.12:3-5 D '65. (MIRA 19:1)

L 01067-67 EWT(1) FDN/WW

ACC NR: AP6029084 SOURCE CODE: UR/0413/66/000/014/0158/0158

41
13

INVENTOR: Shustov, M. I.

ORG: none

TITLE: Level gage. Class 42, No. 145026

SOURCE: Izobret prom obraz tov zn, no. 14, 1966, 158

TOPIC TAGS: fluid level gage, liquid level indicator, liquid level instrument, servosystem

ABSTRACT: The proposed level gage consists of a high-frequency generator with a capacitance transducer, a frequency detector, and a servo system which adjusts the generator frequency and indicates the level. In order to instantaneously measure the amplitude of the level fluctuation, filters are mounted at the frequency detector output; these separate the oscillating component of the signal, which is proportional to the amplitude of the level fluctuation. [AV]

SUB CODE: 13,09/ SUBM DATE: 22Feb61

Card 1/1 vlr

L 27736-66 EWT(l)/EWA(h)/ETC(m)-6 WW

ACC NR: AP6001187 (A) SOURCE CODE: UR/0119/65/000/012/0003/0005

AUTHOR: Shustov, M. L. (Eng.)

ORG: None

TITLE: Properties of the capacitance type level gage for liquids

SOURCE: Priborostroyeniye, no. 12, 1965, 3-5

TOPIC TAGS: automatic control equipment, electric capacitance, measuring apparatus

ABSTRACT: The application of electrostatic capacitance properties to control and regulate the level of a fluid surface was discussed. A level-control device shown schematically in Fig. I (see Card 2/2) was described by the author in the Patent No. 136923 of 1960, published in the "Byulleten' izobreteniy" (Bulletin of Inventions), 1961, no. 6. In the present paper, the author investigated the possibility of using this device for measuring the levels when the ratio $H/x_{max} = 50/I$. For this purpose, he suggested applying to the gage cylinder a high-frequency current having a wavelength commensurable with the height H of the cylinder. In such a case, the cylindrical capacitor could be substituted in calculations by a long line which has a periodically changing impedance and is open-circuited at the receiving end. It was assumed that

Card 1/2 UDC: 681.128:621.3.011.4

L 27736-66

ACC NR: AP6001187

the dielectric properties of the insulation of the inner electrode were not affected by the temperature, also that the temperature of the liquid exercised no influence on the input impedance. It was assumed, too, that there was no loss of energy and that the distribution of capacitance and inductance along the cylinders was uniform. With these assumptions in mind, the author calculated the input impedance for various heights and dimensions and presented the results in two graphs. The calculations were made for non-conducting fluids. The length of the line can be increased by making longer the cable line connecting the level gage with the measuring circuit and by selecting a proper ratio between the gage height and the wavelength. The formulas for calculating the wavelength, the gage height and the length of the cable line were derived. The use of cables with thermal-stable fillers (such as Teflon) was recommended. Finally, the sensitivity of the gage was calculated and graphically expressed. Orig. art. has: 4 figures and 14 formulas.

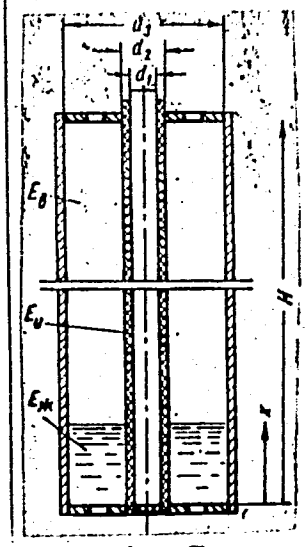


Fig. I

SUB CODE: 14 / SUBM DATE: None / ORIG REF: 008 / OTH REF: 001

Card 2/2

L 32922-66 EWT(m)/T/EWP(f) WW

ACC NR: AP6018352 SOURCE CODE: UR/0089/66/020/005/0412/0415

AUTHOR: Ratnikov, Ye. F.; Shustov, M. V.

ORG: none

TITLE: The effect of certain cycle parameters on the efficiency of a nuclear gas turbine plant

SOURCE: Atomnaya energiya, v. 20, no. 5, 1966, 412-415

TOPIC TAGS: gas turbine, gas cooled nuclear reactor, regenerative cooling

ABSTRACT: The results of an investigation of the effect of the turbine inlet temperature, gas pressure, compression ratio, and regeneration and intermediate cooling and heating of gas on the internal efficiency of a nuclear gas turbine plant with respect to the performance of the reactor are presented. The internal efficiency in the reactor core is discussed in terms of the following factors:

$$\eta_i = \frac{\left[\left(1-\frac{\Delta p^m}{\sigma^m}\right)\eta_{\tau}-\frac{\tau}{\eta_{ii}}(\sigma^m-1)\right]K_t}{\delta-\mu\left[1-\left(1-\frac{\Delta p^m}{\sigma^m}\right)\eta_{\tau}\right]-(1-\mu)\tau\left(1+\frac{\sigma^m-1}{\eta_{ii}}\right)},$$ where $$\Delta p=\frac{p_1+\Delta p_p+\sigma\Delta p_{p.x}}{p_1};$$

UDC: 621.039.553.3

Card 1/3

$$K_t=\frac{k_r k_{\Delta t}}{k_G}\left[0{,}5+\sqrt{\frac{0{,}25}{\sin^2\frac{\pi}{2}\cdot\frac{H}{H_e}}+\left(\frac{k_h k_G \bar{c}_p G_T}{k_{\Delta t}\alpha_K F_p}\right)^2}\right];$$

$$\sigma=\frac{p_5}{p_4};$$

$$\tau=\frac{T_4}{T_1};$$

$$\delta=\frac{T_{cr}^{max}}{T_1};$$

$$\mu=\frac{T_6-T_5}{T_2-T_5}.$$

and σ is the compression ratio of the cycle; μ is the rate of heat recovery; p_1 is the initial gas pressure; Δp_p is the hydraulic resistance of the reactor (including plumbing); $\Delta p_{p,x}$ is the hydraulic resistance in the heat exchanger and cooler (including plumbing); k_r, k_h are coefficients of nonuniformity in the radius and height of the reactor, respectively; k_G is the coefficient of nonuniformity in the gas flow rates in the ducts; $k_{\Delta t}$ is the coefficient of temperature deviation from